

ELECTRICITY INDUSTRY PARTICIPATION CODE  
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

NEW ZEALAND TRANSPORT AGENCY  
AND MERIDIAN ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 3 May 2020

Date audit report completed: 28 May 2020

Audit report due date: 01-Jun-20

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## EXECUTIVE SUMMARY

This audit of the Christchurch New Zealand Transport Authority (**NZTA**) DUML database and processes was conducted at the request of Meridian Energy Limited (**Meridian**), in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was largely conducted in accordance with the audit guidelines for DUML audits version 1.1. A field audit was not undertaken due to the restrictions imposed by the Covid-19 lockdown; therefore, the following checks were conducted:

- new connection records including as-built plans were checked for 42 new streetlights installed on the Northern Motorway and Northcote Expressway, and
- results of the 2018 field audit were checked to ensure the database was updated.

The database is managed by Orion, the Distributor for parts of the Canterbury area. The streetlight data is held in Orion's GIS and an SQL database, which interfaces with the GIS.

This audit found three non-compliances and makes no recommendations. One minor discrepancy was found in the database during the checks against the new connection records for 42 new streetlights installed on the Northern Motorway and Northcote Expressway. Orion had corrected this prior to the completion of the audit.

The future risk rating of six indicates that the next audit be completed in 18 months. The database is now accurate; therefore, I recommend the next audit is conducted in 24 months.

## AUDIT SUMMARY

### NON-COMPLIANCES

Subject	Section	Clause	Non Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	Wattage incorrectly recorded in database for one new lamp resulting in an estimated under submission of 85kWh per annum.  The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Moderate	Low	2	Investigating
Database accuracy	3.1	Clause 15.2 and 15.37B(b)	Wattage incorrectly recorded in database for one new lamp resulting in an estimated under submission of 85kWh per annum.	Moderate	Low	2	Cleared
Volume accuracy	3.2	15.2 and 15.37B(c)	Wattage incorrectly recorded in database for one lamp resulting in an estimated under submission of 85kWh per annum.  The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Moderate	Low	2	Investigating
<b>Future Risk Rating</b>						<b>6</b>	

<b>Future risk rating</b>	0	1-4	5-8	9-15	16-18	19+
<b>Indicative audit frequency</b>	36 months	24 months	18 months	12 months	6 months	3 months

### RECOMMENDATIONS

Subject	Section	Description	Recommendation
		Nil	

### ISSUES

Subject	Section	Description	Issue
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		Nil	
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## 1. ADMINISTRATIVE

### 1.1. Exemptions from Obligations to Comply with Code

#### **Code reference**

*Section 11 of Electricity Industry Act 2010.*

#### **Code related audit information**

*Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.*

#### **Audit observation**

The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

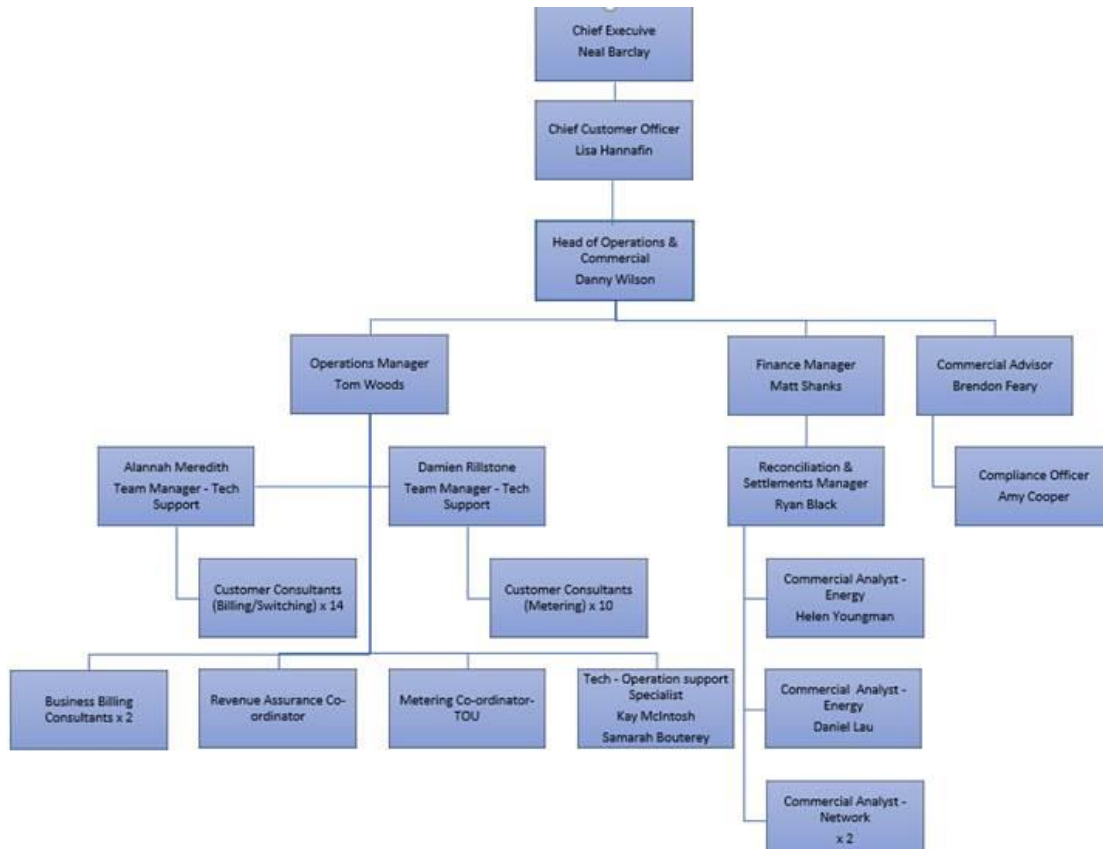
There are no exemptions in place relevant to the scope of this audit.

#### **Audit commentary**

Compliance is confirmed.

## 1.2. Structure of Organisation

Meridian Energy provided a copy of their organisational structure.



### 1.3. Persons involved in this audit

Auditors:

**Rebecca Elliot**

**Veritek Limited**

**Electricity Authority Approved Auditor**

Supporting Auditor:

**Brett Piskulic**

**Veritek Limited**

**Electricity Authority Approved Auditor**

Other personnel assisting in this audit were:

Name	Title	Company
Amy Cooper	Compliance Officer	Meridian Energy
Helen Youngman	Energy Data Analyst	Meridian Energy
Penny Lawrence	Operations Services	Orion

### 1.4. Hardware and Software

Orion use a purpose-built Oracle system for the management of the DUML information. Backup and restoration procedures are in accordance with normal industry protocols.

EMS and Meridian systems used in the process are discussed in their agent and reconciliation participant audit reports.

### 1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

### 1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0007131646RN811	Ref Orion_TNZ GXP urban street light ICP	BRY0661	DST	95	15,220
0007131641RN5DB	Ref Orion_TNZ GXP rural street light ICP	CLH0111	DST	1	114
0007131642RN91B	Ref Orion_TNZ GXP rural street light ICP	HOR0331	DST	19	2,352
0007135577RN62F	Ref Orion_TNZ GXP rural street light ICP	HOR0661	DST	0	0



ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0007131647RN454	Ref Orion_TNZ GXP urban street light ICP	ISL0331	DST	181	39,997
0007131644RN894	Ref Orion_TNZ GXP rural street light ICP	ISL0661	DST	1,364	282,249
0007152477RN913	Ref Orion_TNZ KBY0661 GXP rural street light ICP	KBY0661	DST	32	4,508
<b>Total</b>				<b>1,692</b>	<b>344,440</b>

### 1.7. Authorisation Received

All information was provided directly by Meridian or Orion.

### 1.8. Scope of Audit

This audit of the Orion DUMML database and processes was conducted at the request of Meridian, in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was largely conducted in accordance with the audit guidelines for DUMML audits version 1.1. A field audit was not undertaken due to the restrictions imposed by the Covid-19 lockdown; therefore, the following checks were conducted:

- new connection records including as-built plans were checked for 42 new streetlights installed on the Northern Motorway and Northcote Expressway, and
- results of the 2018 field audit were checked to ensure the database was updated.

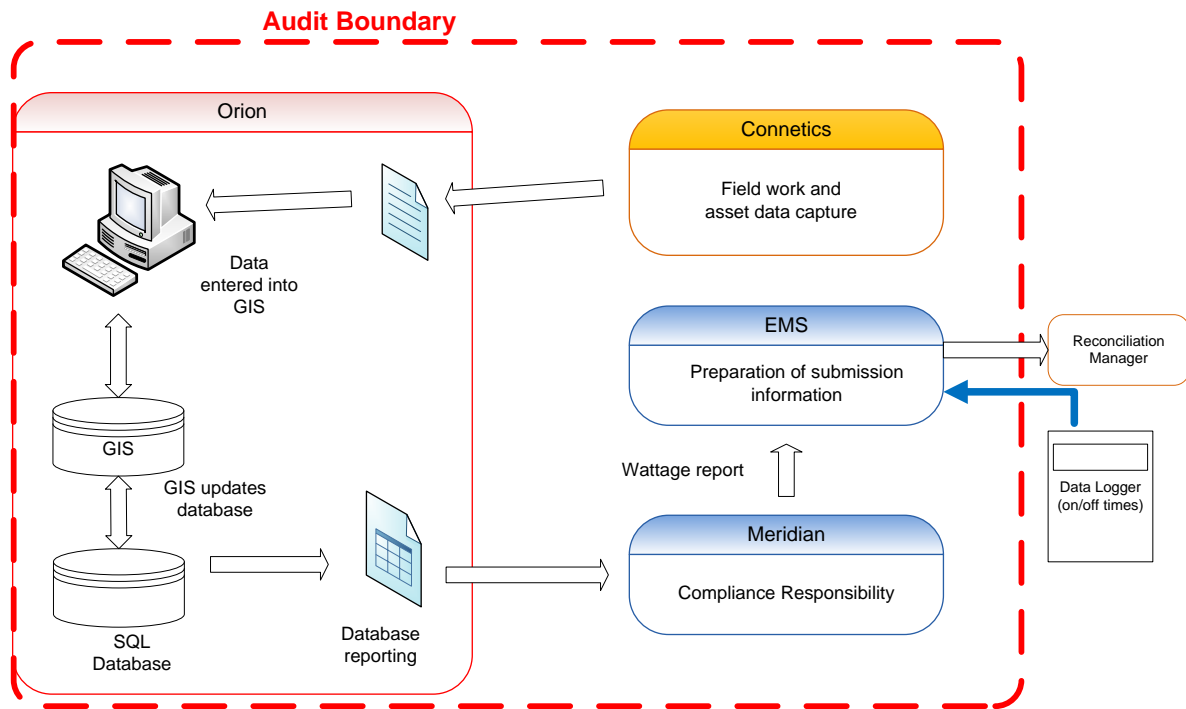
The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the database reporting.

The NZTA boundary is part of the Orion Network. Orion manages their own database for NZTA. Monthly reporting is supplied to Meridian by Orion.

This audit covers the Orion database. The database is managed by Orion, the Distributor for parts of the Canterbury area. The streetlight data is held in Orion's GIS and an SQL database. There is an interface between the SQL database and GIS. Orion engages Connetics for the fieldwork and asset data capture. They use a RAMM database. Orion has a well-defined process to manage any additions/changes. Once the work is complete, the data is manually entered into the GIS, which then populates the database.

The diagram below shows the audit boundary for clarity.

Orion Database



### 1.9. Summary of previous audit

Meridian provided a copy of the last audit report undertaken by Steve Woods of Veritek, completed in May 2018. Four non-compliances were identified, and no recommendations were made. The current status of the non-compliances is detailed below.

### Table of Non-Compliance

Subject	Section	Clause	Non-Compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The database used to prepare submissions contains some inaccurate information: <ul style="list-style-type: none"> <li>one less lamp in the field,</li> <li>the database accuracy is assessed to be 99.52% indicating an estimated over submission of 6,209 kWh per annum.</li> </ul>	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	One lamp type has incorrect lamp wattage recorded. The expected wattage is 77 and expected under reporting is 34.2 kWh per annum.	Cleared

Subject	Section	Clause	Non-Compliance	Status
Database accuracy	3.1		<p>The database used to prepare submissions contains some inaccurate information:</p> <ul style="list-style-type: none"> <li>• one less lamp in the field, and</li> <li>• the database accuracy is assessed to be 99.52% indicating an estimated over submission of 6,209 kWh per annum</li> </ul>	Cleared
Volume accuracy	3.2	11(1) of Schedule 15.3	The database accuracy is assessed to be 99.52% indicating an estimated over submission of 6,209 kWh per annum.	Cleared

### 1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

#### Code reference

Clause 16A.26 and 17.295F

#### Code related audit information

Retailers must ensure that DUML database audits are completed:

1. by 1 June 2018 (for DUML that existed prior to 1 June 2017)
2. within 3 months of submission to the reconciliation manager (for new DUML)
3. within the timeframe specified by the Authority for DUML that has been audited since 1 June 2017.

#### Audit observation

Meridian have requested Veritek to undertake this streetlight audit.

#### Audit commentary

This audit report confirms that the requirement to conduct an audit has been met for the Orion database within the required timeframe. Compliance is confirmed.

## 2. DUMML DATABASE REQUIREMENTS

### 2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

#### Code reference

*Clause 11(1) of Schedule 15.3*

#### Code related audit information

*The retailer must ensure the:*

- *DUMML database is up to date*
- *methodology for deriving submission information complies with Schedule 15.5.*

#### Audit observation

The process for calculation of consumption was examined and the application of profiles was checked. The database was checked for accuracy.

#### Audit commentary

Meridian reconciles this DUMML load using the DST profile. The on and off times are derived from a data logger read by EMS. This information is used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process has been audited to confirm its accuracy and compliance. Compliance is confirmed.

I checked the extract provided by Orion against the March 2020 submission totals supplied by Meridian and found that submission matched the database.

Wattage of one new lamp incorrectly recorded in the database is resulting in an estimated under submission of 85 kWh per annum as recorded in **section 3.1**. Orion has now updated the database to the correct wattage.

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUMML load and volumes.

The current data used is a snapshot and this practice is non-compliant.

#### Audit outcome

Non-compliant

Non-compliance	Description
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Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3  From: 18-Jun-19 To: 11-May-20	Wattage incorrectly recorded in database for one new lamp resulting in an estimated under submission of 85kWh per annum.  The data used for submission does not track changes at a daily basis and is provided as a snapshot.  Potential impact: Low  Actual impact: Low  Audit history: None  Controls: Moderate  Breach risk rating: 2		
<b>Audit risk rating</b>	<b>Rationale for audit risk rating</b>		
<b>Low</b>	The controls are rated as moderate, because they are sufficient to ensure that additions to the database are correctly recorded most of the time.  The impact is assessed to be low, based on the kWh difference described above.		
<b>Actions taken to resolve the issue</b>	<b>Completion date</b>	<b>Remedial action status</b>	
The incorrect wattage identified has been corrected.  We are considering how we can redesign our processes to incorporate the calculation of volumes at a daily level rather than a monthly snapshot.	Complete  Ongoing	Investigating	
<b>Preventative actions taken to ensure no further issues will occur</b>	<b>Completion date</b>		
Current controls for management of database changes are considered adequate.			

## 2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

### Code reference

*Clause 11(2)(a) and (aa) of Schedule 15.3*

### Code related audit information

*The DUML database must contain:*

- *each ICP identifier for which the retailer is responsible for the DUML*
- *the items of load associated with the ICP identifier.*

### Audit observation

The database was checked to confirm the correct ICP was recorded against each item of load.

### Audit commentary

All Orion items of load have an ICP recorded against them.

### Audit outcome

Compliant

### 2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

#### Code reference

*Clause 11(2)(b) of Schedule 15.3*

#### Code related audit information

*The DUMML database must contain the location of each DUMML item.*

#### Audit observation

The database was checked to confirm the location is recorded for all items of load.

#### Audit commentary

The Orion database contains fields for the street address and also GPS coordinates. There are 10 records that do not have a street number. In these cases, the location is defined as the intersection of two roads in the Street field and in all cases, there is GPS information.

#### Audit outcome

Compliant

### 2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

#### Code reference

*Clause 11(2)(c) and (d) of Schedule 15.3*

#### Code related audit information

*The DUMML database must contain:*

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

#### Audit observation

The databases were checked to confirm that they contained a field for lamp type and wattage capacity and included any ballast or gear wattage and that each item of load had a value recorded in these fields.

#### Audit commentary

Orion's database contains the manufacturers rated wattage and the ballast wattage. The extract provided has a field for 'Lamp Type' and an additional table was provided which contained more detail for each lamp type – description, amps, wattage (incl ballast) & lamp type category.

The accuracy of lamp descriptions, wattages and ballasts is recorded in **section 3.1**.

#### Audit outcome

Compliant

### 2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

#### Code reference

*Clause 11(2A) of Schedule 15.3*

#### Code related audit information

*The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.*

#### **Audit observation**

A field audit was undertaken during the previous audit of a statistical sample of 152 items of load on 26 - 27<sup>th</sup> April 2018.

#### **Audit commentary**

No additional items of load were identified during the 2018 audit. In this audit I have checked new lamp connections and confirmed they have been added correctly. This is discussed in **section 3.1**.

#### **Audit outcome**

Compliant

### 2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

#### **Code reference**

*Clause 11(3) of Schedule 15.3*

#### **Code related audit information**

*The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.*

#### **Audit observation**

The process for tracking of changes in the database was examined.

#### **Audit commentary**

The Orion database functionality achieves compliance with the code. The change management process and the compliance of the database reporting provided to Meridian is detailed in **sections 3.1** and **3.2**.

#### **Audit outcome**

Compliant

### 2.7. Audit trail (Clause 11(4) of Schedule 15.3)

#### **Code reference**

*Clause 11(4) of Schedule 15.3*

#### **Code related audit information**

*The DUML database must incorporate an audit trail of all additions and changes that identify:*

- *the before and after values for changes*
- *the date and time of the change or addition*
- *the person who made the addition or change to the database*

#### **Audit observation**

The database was checked for audit trails.

#### **Audit commentary**

Orion demonstrated a complete audit trail of all additions and changes to the database information.

#### **Audit outcome**

Compliant

### 3. ACCURACY OF DUML DATABASE

#### 3.1. Database accuracy (Clause 15.2 and 15.37B(b))

##### Code reference

*Clause 15.2 and 15.37B(b)*

##### Code related audit information

*Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.*

##### Audit observation

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority.

The findings of the field audit undertaken during the last audit were reviewed to determine if the database had been updated.

The change management process to track changes and timeliness of database updates was evaluated.

##### Audit commentary

##### Lamp description and capacity accuracy

The Orion database was found to have no inaccuracies when compared to the published standardised wattage table. In the previous audit there was a discrepancy recorded for four fluorescent lamps which has been corrected.

##### Previous field audit findings

I checked if the database had been updated to reflect the findings of the field audit undertaken during the last audit.

The 2018 field audit found one less lamp in the field than was recorded in the database. I confirmed that this lamp has been removed from the database.

##### Change management process findings

Connectics is the maintenance contractor responsible for the maintenance of the NZTA streetlights on the Orion Network. Outage patrols are conducted on a regular basis. Lamp outages are also notified by residents and work requests are made to Connetics personnel.

New streetlights require a proposed design to be provided which is then approved by the Orion contract manager. On completion of the work the contractor is required to supply the following documents:

As-Built - Showing full design including pole and lamp specs,

LVA – (Low voltage alteration sheet) Outlining Cable size, circuits, cable tests and date of testing etc,

Test Certs - Lamp ID, Location, Tested, Livened (this date is used in the DB), GPS Co-ords,

COC - Certificate of Compliance,

ROI - record of inspection,

Completion Cert from Contractor notifying Orion of completed works, and

An Orion Completion Cert issued once all the above is complete.

Once all the above has been received, the As-built/LVA are input into GIS and the streetlight database.

I checked the new connection documentation for a sample of 42 streetlights installed on the Northern Motorway and Northcote Expressway. I found one discrepancy between the as-built documentation and the database. The wattage recorded in the database for pole number 621 on the Northcote Expressway was recorded as 120 watts, the as-built documentation recorded the wattage as 150 watts. This will result



in estimated under submission of 85kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool). Orion has now updated the database to the correct wattage. The database information matched the “as built” documentation for all of the other 41 streetlights.

**Audit outcome**

Non-compliant

Non-compliance	Description		
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b)  From: 30-Sep-19 To: 11-May-20	Wattage incorrectly recorded in database for one new lamp resulting in an estimated under submission of 85kWh per annum.  Potential impact: Low  Actual impact: Low  Audit history: Twice  Controls: Moderate  Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	The controls are rated as moderate, because they are sufficient to ensure that additions to the database are correctly recorded most of the time.  The impact is assessed to be low, based on the kWh difference described above.		
Actions taken to resolve the issue		Completion date	Remedial action status
The incorrect wattage identified has been corrected.		Complete	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
Current controls for management of database changes are considered adequate.			

**3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))**

**Code reference**

*Clause 15.2 and 15.37B(c)*

**Code related audit information**

*The audit must verify that:*

- *volume information for the DUML is being calculated accurately*
- *profiles for DUML have been correctly applied.*

**Audit observation**

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that the ICP has the correct profile and submission flag, and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

### Audit commentary

Meridian reconciles this DUML load using the DST profile, submissions are based on the database information, with on and off times derived from data logger information.

I checked the submissions for March 2020, and I confirmed that the calculation method and total was correct.

Wattage of one new lamp incorrectly recorded in the database is resulting in an estimated under submission of 85 kWh per annum as recorded in **section 3.1**. Orion has now updated the database to the correct wattage.

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current data used is a snapshot and this practice is non-compliant.

### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)  From: 18-Jun-19 To: 11-May-20	Wattage incorrectly recorded in database for one new lamp resulting in an estimated under submission of 85kWh per annum.  The data used for submission does not track changes at a daily basis and is provided as a snapshot.  Potential impact: Medium Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	The controls are rated as moderate, because they are sufficient to ensure that additions to the database are correctly recorded most of the time.  The impact is assessed to be low, based on the kWh difference described above.		
Actions taken to resolve the issue		Completion date	Remedial action status
The incorrect wattage identified has been corrected.  We are considering how we can redesign our processes to incorporate the calculation of volumes at a daily level rather than a monthly snapshot.		Complete  Ongoing	Investigating

<b>Preventative actions taken to ensure no further issues will occur</b>	<b>Completion date</b>	
Current controls for management of database changes are considered adequate.		

## CONCLUSION

The audit was largely conducted in accordance with the audit guidelines for DUMML audits version 1.1. A field audit was not undertaken due to the restrictions imposed by the Covid-19 lockdown; therefore, the following checks were conducted:

- new connection records including as-built plans were checked for 42 new streetlights installed on the Northern Motorway and Northcote Expressway, and
- results of the 2018 field audit were checked to ensure the database was updated.

The database is managed by Orion, the Distributor for parts of the Canterbury area. The streetlight data is held in Orion's GIS and an SQL database, which interfaces with the GIS.

This audit found three non-compliances and makes no recommendations. One minor discrepancy was found in the database during the checks against the new connection records for 42 new streetlights installed on the Northern Motorway and Northcote Expressway. Orion had corrected this prior to the completion of the audit.

The future risk rating of six indicates that the next audit be completed in 18 months. The database is now accurate; therefore, I recommend the next audit is conducted in 24 months.

## PARTICIPANT RESPONSE

Meridian has read the Authority's memo dated 18 June 2019 that clarifies the intent of the previously issued memo (Sept 2012) regarding the tracking of changes in the DUML database and how this should be considered when calculating monthly load.

This clarification has resulted in our current processes now being recorded as non-compliant where for the preceding 7 years they had been considered and recorded as compliant.

We are now considering how we may be able to redesign our processes to comply with this new information which has impacts for both the process for calculating settlement information and our billing information.

At this stage we are uncertain as to when a practical solution for this may be implemented but do understand the impact to settlement as a result of using a monthly snapshot is considered minor.